The purpose of this spreadsheet is to derive Acceptable Tissue Levels (ATLs; also known as Target Tissue Co (SLVs) for total PCBs for use in Portland Harbor that would be protective of birds that eat fish, and to evalu Assessment (BERA). Two approaches were used to derive the SLVs and ATLs; the dietary approach and the Another purpose is to identify any mathematical errors and discrepancies in the calculations used to determine if a better TRV can be established for PCBs.

The spreadsheet compares various risk parameters used by LWG in the 2011 BERA to values 1) recommend EPA (1995) Great Lakes Initiative document.

The SLVs are presented in the "SLVs\_Compared" tab, and TRVs and ATLs are compared in the "Eco TRVs + rates and body weights from multiple sources, and re-calculates TRVs based on these values. SLVs were calculate, to evaluate sensitivity of the BSAF value) will automatically update the SLV values presented in the "Eco TRVs + rates and body weights from multiple sources, and re-calculates TRVs based on these values. SLVs were calculated to evaluate sensitivity of the BSAF value) will automatically update the SLV values presented in the "Eco TRVs + rates and body weights from multiple sources, and re-calculates TRVs based on these values. SLVs were calculated to evaluate sensitivity of the BSAF value) will automatically update the SLV values presented in the "Eco TRVs + rates and body weights from multiple sources, and re-calculates TRVs based on these values.

Some discrepancies were observed in calculations between LWG and EcoSSLs, which can be seen in the "IR used to calculate TRVs account for some discrepancies (e.g., slight body weight difference results in large T dry and wet weight doses and ingestion rates. The values calculated here were conducted by matching dry cases it was unknown or unreported in the literature if a dose was dry or weight, but in these cases the stu have made little difference in the outcome.

The final yellow highlighted row under each species in the "SLVs\_Compared" tab and the "Eco TRVs + ATLs would provide the best scientifically-supported level of protection for upper trophic level species to totaql for some species exceeds ATL values that are considered protective of fish, and no uncertainty or safety factoxicity values are unavailable, or for sensitive species or guilds).

nncentrations (TTCs) or Target Tissue Levels (TTLs), and Sediment Screening Levels ate or double check specific parameters used in the Baseline Ecological Risk ≥ egg approach, which are discussed in the notes section of the "SLVs\_Compared" tab. mine Toxicity Reference Values (TRVs), identify why these discrepancies may have

led previously by EPA, 2) are in Oregon DEQ's bioaccumulation guidance, and 3) the

ATLs+SLVs". The "IRs&BodyWtComparisons" sheet presents and compares ingestion alculated using a generic BSAF for PCBs of 4. Changing the BSAF in the appropriate in the "SLVs\_compared tab".

s&BodyWtComparisons" tab. Some differences in ingestion rates and body weights RV differences), and other differences were associated with interpreting or converting / weight doses to dry weight IRs, and wet weight doses to wet weight IRs. In some Judy used lab prepared food which had 10% or less moisture, so any conversions would

5 + SLVs" tab shows the recommended value by US Fish and Wildlife Service (FWS) that PCBs. It should be noted that even the recommended value for the dietary approach ctors were used in the equations (often used in to better protect species were direct

SLV= Value in sediment (µg/kg dry weight) considered protective of avian receptors at the individual an-

	<b>EGG APPI</b>	ROACH	EGG APPROACH		
	Bald	Eagle	Osprey		
	Individual	Population	Individual	Population	
Total PCBs	3				
Gov Tea	10	51	10	51	

DIETARY A	APPROACH	DIETARY A	APPROACH
Bald	Eagle	Os	orey
Individual	Population	Individual	Population
13		38	77

ND = not determined

Final recommended value by FWS

## Notes:

## **EGG APPROACH:**

The egg approach was selected as a risk evaluation tool because the total PCBS cause embryotoxicity dietary approach only indirectly addresses this risk, and data are available on total PCB concentration embyro growth will occur at low PCB concentrations (i.e., at concentrations that may otherwise not i primarily endpoint when evaluating risk for total PCBs, and selecting a PRG value protective of reduce Reduced hatchability was also used as the endpoint to develop the dietary approach, but it is a less c

The bald eagle was the receptor selected to represent protective values based on the egg approach. some correlations in field data (and good correlations in lab test with other bird species) between intin this approach, as bald eagles do eat other prey in addition to fish (including ducks, fish-eating bird bald eagles studied in the lower Columbia River fed primarily on fish (90%) during the breeding seasor For our risk model, we consider total PCBs to be accumulated in the adult female's body over time at fed on heavily during the breeding season, fish likely contribute a large portion of the PCB body burd the eggs themselves.

Using the SLV based on bald eagles should be protective of most other fish-eating birds. However, the range may be considered important in a risk evaluation. The eagle's primarily foraging range during some level of site use factor may be considered when evaluating risk using the SLVs.

## **DIETARY APPROACH:**

Dietary exposure to PCBs can cause reduced hatchability, reduced growth in embryos, embryo mor based on reduced hatchability. The recommended sediment screening value for total PCBs (15 and considered protective of reduced hatchability in kingfishers. The kingfisher was selected as the best more of an obligate fish-eater compared to other species, and is non-migratory in this area (see Kelly protective of mortality for most other fish-eating bird species, and it is likely that a site use factor wo

d population levels (based on BSAF of 4)

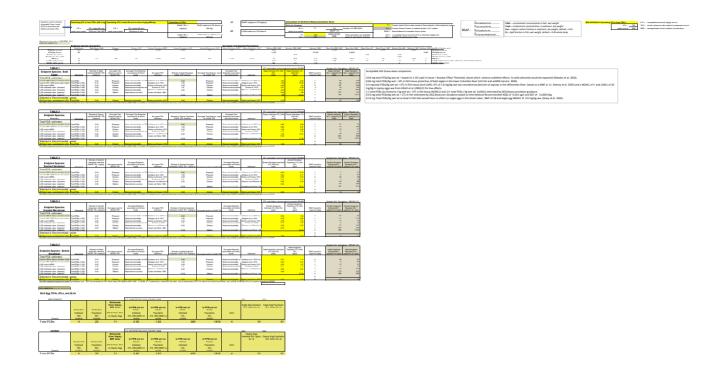
DIETARY A	APPROACH	DIETARY.	APPROACH	DIETARY A	APPROACH	
Spotted 9	Sandpiper	Hooded r	nerganser	Kingfisher		
Individual	Population	Individual	Population	Individual	Population	
10	19	22	44	15	30	

, in birds and can reduce hatchability, cause deformities, and impact growth. The ns in bird eggs that reduce hatchability. Reduced hatchability and reduced impact the adult bird). For this reason, reduced hatchability was selected as the ced hatchability will mostly likely be protective of all other effects from PCBs. direct measurement.

The eagle was selected to represent resident, fish-eating birds, and there are creased total PCBsin eggs and lowered productivity). There is some uncertainty s, some mammals, and also scavenge when opportunity is available). However, on, whereas they relied a bit more on waterfowl during the non-breeding season. nd especially during the month before nesting and egg laying. Because fish are lens in the adult female just prior to egg laying, as well as to the PCB burden in

he foraging range of an eagle is large compared to other birds and the larger the breeding season is considered to be within 1 mile of a nest site. Therefore,

tality, and other effects. For the dietary approach, risk from total PCBs was 30 ppb) was based on kingfisher exposure. Thus, the sediment values are representative species for Portland Harbor because it has a small home range, is y et al. 2009). Therefore, protection at the kingfisher level would most likely be ould not be needed to fully represent risk.



Selecte	Selected studies of from LWG in BERA							
					LWG	LWG		
			Study	Study	Study	Study		
			Dose for	Dose for	Dose for	Dose for		
			NOAEL	LOAEL	NOAEL	LOAEL	Fraction	
			mg/kg	mg/kg	mg/kg	mg/kg	moisture in	Ingestion Rate
	Chemical		(WET wt)	(WET wt)	DRY WT	DRY WT	food	(IR) kg/day
Kestrel		1254				3.3	0.1	0.0136
Chicken		1254	40					0.0034
Chicken		1242	5	10				0.0997
Chicken		1248	1	10				0.105
Chicken		1254	5	45		50	0.1	0.0997
Chicken		1232		20				0.0997
Mallard		1254	25					0.1082
Mallard		1254	39					0.1082
Mallard		1242		150				0.1082

Selected for use as avian TRV in BERA

LWG did not adjust the LOAEL value to wet wt before doing calculation (the IR is in wet wt). Using a %moist Receptor-chemical evaluation not conducted by LWG (instead they used EcoSSL for DDT of 0.227 mg/kg-d)

Data used by the Great Lakes Initiative as reported by EPA 1995						
						Ingestion Rate (IR) kg/day
		Study	Study			WET WT
Surrogate		Dose for	Dose for	Fra	ction	unless
Test		NOAEL	LOAEL	mois	ture in	otherwise
Species Chemica		mg/kg	mg/kg	fc	ood	noted
Pheasant	1254	2	20	1	NR .	Inferred
Chicken	1248	1	10	(	).1	0.067
Chicken 124,212	,481,254	2	20	(	).1	0.067
Chicken	1254		5	(	).1	0.067
Chicken	1242	5	10	(	).1	0.067

Selected for use as the avian TRV

Data us	sed by D	EQ Bioaccur	nulation Guidar	nce	
					Ingestion Rate
					(IR) kg/day
		Study	Study		WET WT
Surrogate		Dose for	Dose for	Fraction	unless
Test		NOAEL	LOAEL	moisture in	otherwise
Species	Chemical	mg/kg	mg/kg	food	noted
		1254		NR	Inferred

Selected based on EPA 1995 according to guidance but unknown which species was used.

Body Weight	NOAEL	LOAEL mg/kg-	NOAEL	r calculation for LOAEL
(BW) kg	mg/kg-day	day	(mg/kg-day)	(mg/kg-day)
0.13		0.35		0.35
2.56	0.054		0.05	
1.71	0.29	0.58	0.29	0.58
1.71	0.061	0.61	0.06	0.61
1.71	0.29	2.90	0.29	2.62
1.71		1.20		1.17
1.082	2.5		2.5	
1.082	3.9		3.9	
1.082		15		15

ture of 1, the LOAEL actually should be 2.62 (unless LWG mislabelled the 50 value as dw).

			Check: Test	Check: Test
Body			calculation for	r calculation for
Weight	NOAEL	LOAEL mg/kg-	NOAEL	LOAEL
(BW) kg	mg/kg-day	day	(mg/kg-day)	(mg/kg-day)
1	0.18	1.8	#VALUE!	#VALUE!
2	0.067	0.67	0.07	0.67
2	0.13	1.30	0.13	1.34
2		0.58		0.34
2	0.34		0.34	0.67

			Check: Test	Check: Test
Body			calculation for	calculation for
Weight	NOAEL	LOAEL mg/kg-	NOAEL	LOAEL
(BW) kg	mg/kg-day	day	(mg/kg-day)	(mg/kg-day)
1	0.2	0.6	#VALUE!	#VALUE!

Ref
reduced eggshell weight Lowe and Stendell 1991 no effect fertility and hat Ahmed at la. 1978
Reduced hatchability Britton and Huston 1973
Reduced egg productior Scott et al. 1975
Reduced hatchability Platonow and Reinhart 1973
Reduced hatchability, er Cecil et al 1974
Reproductive success Custer and Heinz 1980
No effect on egg produc Risebrough and Anderson 1975 Reduced hatchability, er Haseltine and Prouty 1980
Treduced Hatchability, et Haseitine and Frouty 1900
$DW = ww^*1 / 1- %moisture$
Ref
Hatchability Dahlgren et al. 1972
Egg production and hatc Scott 1977 Egg production and hatc Lillie et al. (1974)
Egg production and ferti Platonow and Reinhart (1973)
No effects at 5 ppm, sig Britton and Huston (1973)
Ref

## **REFEENCES**

Birds NOAL and LOAL dietary TRV in mg/kg day

LWG

**Total PCBs** 

0.29 NOAEL

0.58 LOAEL

Britton and

TRVs are based on reduced egg hatchability in chickens, which have high sensitivity to PCBs toxicity compared wit

Mammal NOAL and LOAL dietary TRV in mg/kg day

**Total PCBs** 

0.0074c NOAEL

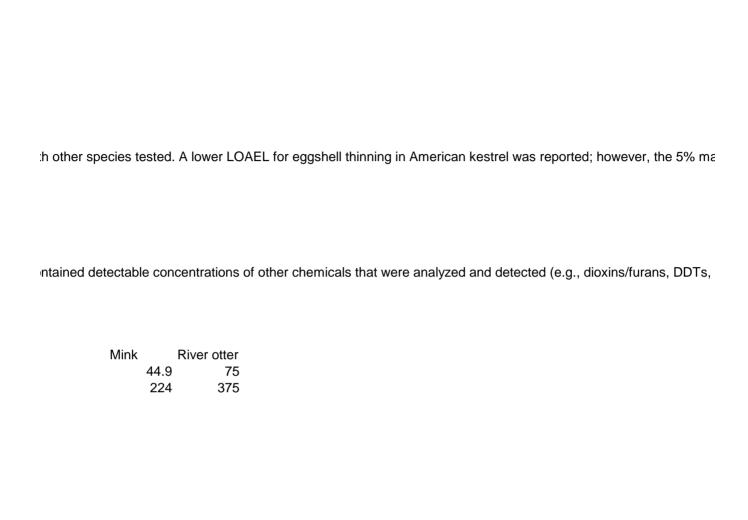
0.037 LOAEL

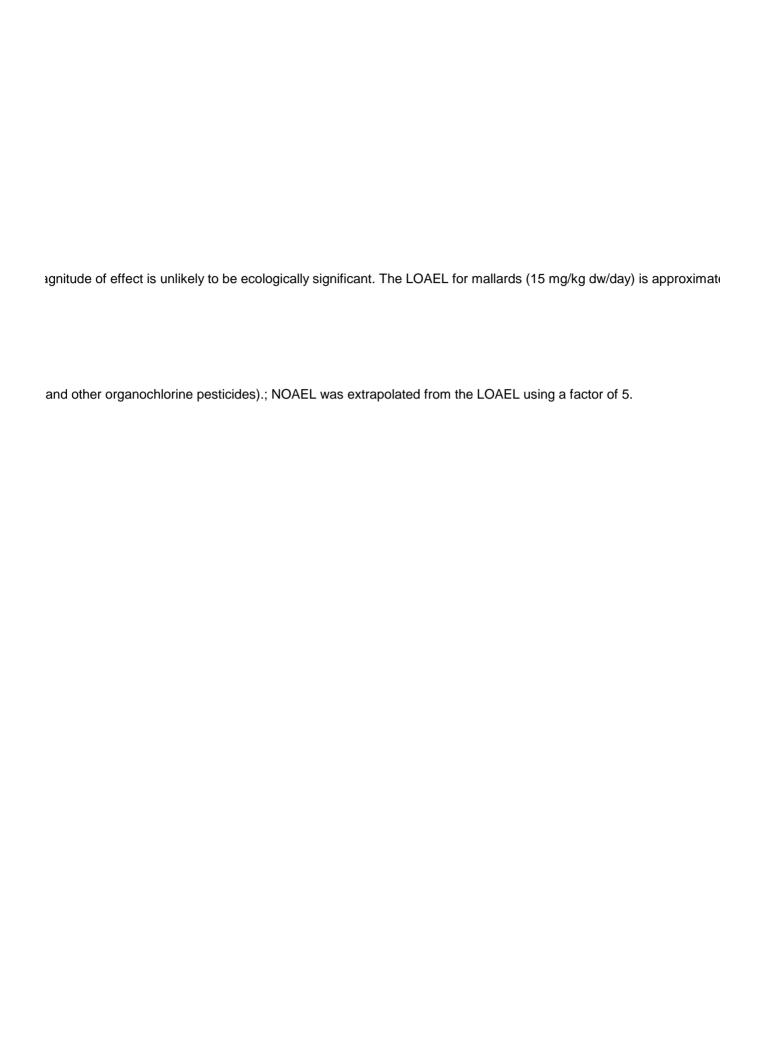
Restum et al. (1998)

TRVs are based on several mink reproduction endpoints. study in which mMink were fed field-collected fish that co

TTC (Prey Tissue)

		(		
Spotted San	dpiper	Hooded Merganser	Bald Eagle	Osprey
NOAEL	248	783	2420	1,380
LOAEL	496	1570	4,830	2,760
μg/kg ww				





ely 30 times as great as the	e selected LOAEL (Attachm	ent 14), indicating the sele	ected TRV may overestima	te effects

